Abstract

This project investigated ion uptake by fish endemic to Georgia, known as Lake Sturgeon (*Acipenser fulvescens*), which were acquired from a hatchery and naturally found in the Coosa River. For this investigation, identical recirculating tank systems provided separated environments for the two types of water treatments. Equal test groups were placed into the different water chemistries, one into the Coosa River and the other into the regular dechlorinated tap water. All subjects consumed the same type of food: Rangen, which is a commercial chow mix, and blood worm. The Coosa River water differs in ionic composition compared to the hatchery environment, with lower environmental [Ca^{2+}] and higher concentrations of Zn^{+} and Mg^{2+}. The transporters of interest included Na^{+}-K^{+}-ATPase, epithelial Ca^{2+} channel, and Na^{+}-Mg^{2+} cotransporter. Overall growth patterns, including weight, body length, and intestinal length and mass differed due to water chemistry. Similarly, gene expression was hypothesized to respond to environmental ion availability. Evidence of changes in gene expression will support the hypothesis that fish in the Coosa River regulate ion transport in conjunction with available nutritional and environmental factors. In order to obtain the necessary genetic information, sampling points were assigned over 21 days at 0, 1, 10, and 21 days post-transfer. During each sampling period, we euthanized five fish per treatment for dissection and collected specific tissue types: gill, liver, and intestine. All tissues were stored at -80°C. During the analysis stage of the project RNA was isolated from both the gill and intestine samples, reverse transcribed into cDNA, and then analyzed for gene expression using RT-qPCR to analyze the effect of water chemistry from the two different exposure treatments, particularly ion transport factors in both of these ion transport organs. This data can be utilized to assist the hatcheries in better understanding the responses of Lake Sturgeon to environmental changes and analyzing whether the differing ion content in the Coosa river water is a factor in whole-animal energy distribution.